

CLAIMS

1. A braking device for an elevator, characterized by comprising:

a movable plunger;

a braking mechanism which is connected to one end of said movable plunger and is switched between a braking state and a releasing state due to a movement in an axial direction of said movable plunger;

a first drive mechanism using a mechanical or magnetic force, for reversing said movable plunger in a middle of a movable range in the axial direction for switching between the braking state and the releasing state to press and hold said movable plunger to a braking side or a releasing side; and

a second drive mechanism using an electromagnetic force, for driving said movable plunger to a reversion position in the middle of the movable range from the braking side or the releasing side against a pressing force of said first drive mechanism in order to switch between the braking state and the release state.

2. The braking device for the elevator according to claim 1, characterized in that said first drive mechanism comprises a belleville spring whose center portion is fixed to said movable plunger.

3. The braking device for the elevator according to claim 1, characterized in that said first drive mechanism comprises a magnetic circuit including a movable iron core and a permanent magnet, for pressing and holding the movable iron core, fixed to said movable plunger, to the driving side or the releasing side.

4. The braking device for the elevator according to any one of claims 1 to 3, characterized in that said second drive mechanism comprises a repulsion plate fixed to said movable plunger, and a braking coil and a releasing coil which are provided on a braking side and a releasing side, respectively, of the repulsion plate in the axial direction of said movable plunger, and generate an eddy current for obtaining a repulsion force between the repulsion plate and the braking coil and between the repulsion plate and the releasing coil.

5. The braking device for the elevator according to claim 3, characterized in that said second drive mechanism comprises a braking coil and a releasing coil which are provided on a braking side and a releasing side of the movable iron core in the axial direction of said movable plunger of the magnetic circuit, and respectively impart an attraction force to the movable iron core.

6. The braking device for the elevator according to claim 1

or 2, characterized in that said second drive mechanism comprises a magnetic circuit including a movable iron core, a braking coil, and a releasing coil, imparting an attraction force from the braking coil and the releasing coil respectively provided on a braking side and a releasing side of the movable iron core in the axial direction of the movable plunger to the movable iron core fixed to the movable plunger.

7. The braking device for the elevator according to claim 1, characterized by comprising two spring structures for imparting forces in opposite directions from positions opposed to each other on a stroke to said movable plunger.

8. The braking device for the elevator according to claim 7, characterized in that, among said two spring structures, a first spring structure imparting a force of pressing said movable plunger to the releasing side includes a spring whose extension range is limited and does not impart a force to said movable plunger while said movable plunger is in a predetermined range from the releasing side.

9. The braking device for the elevator according to claim 8, characterized in that said first spring structure is rotatably connected between said braking mechanism and said first drive

mechanism and said second drive mechanism via a support shaft perpendicular to the axial direction of said movable plunger.